A method of operating an electronic device, in particular a mobile telephone

1   **Specification**

The present invention relates to a method of operating an electronic device, in particular a mobile telephone.

5

BACKGROUND OF THE INVENTION

During operating an electronic device, like a computer, a mobile telephone or the like, a user inputs specific commands, instructions, requests and the like

10   for starting a selected program, for causing a running program to perform specific jobs and/or functions, or the like via a keypad, a voice recognition system or any other suitable input means or by selecting a specific function from a menu. Usually the user of an electronic device knows the specific commands, instructions or requests associated with specific functions or can get

15   the necessary information for triggering a desired function from a manual.

However, electronic devices, in particular mobile telephones are provided with special functions which are only necessary for testing the electronic devices. Consequently, for starting such special functions special codes are used

20   which are normally not known to the common user but only to specialists.

One of such special functions used with mobile telephones is the so-called field test display that can be used to measure the receiving field strength provided by different telecommunications providers.

25

Further, some computer software includes programs hidden by the software designers, so-called "easter eggs". Such hidden programs can be started by specific combinations of keys that are usually not needed by a user for operating the electronic device in a proper manner. For example, a simple flight

30   simulator is hidden in spread sheet or tabulation program Excel 97 of Microsoft. This simple flight simulator can be started by a key combination not mentioned in the manual.

Such specific codes or key combinations not known from the manual but only

35   published and spread around by rumor are interesting for many users, in particular for young users being very familiar with electronic devices. Such users are very eager to get such special codes by systematic trial and error

1 activities. However, after the user got the special code completely the function
or program activated with this code is usually not so interesting for a user as
the trial and error activities necessary to get the code.

5   SUMMARY OF THE INVENTION

The object of the present invention is to provide a further method of operating
an electronic device, in particular a mobile telephone, that provides an opera-
tion mode for triggering specific functions that can be used as a game.

10

To achieve this object a method of operating an electronic device, in particu-
lar a mobile telephone, comprises the steps of: inputting a request for a spe-
cific function or a group of specific functions of the device, wherein the re-
quest consists of at least a string of characters selected by a user; comparing

15 the characters of the string with characters of a randomly generated code
string; and performing the specific function or one of the group of specific
functions if the string input by the user matches at least partly.

Thus, according to the present invention a specific function or one of the

20 group of specific functions will be performed only if one or more characters of
an input string matches respective ones of a code string that is randomly
generated at least for each individual electronic device, e. g. a mobile tele-
phone. Therefore, each user who wants to know the code string has to try to
get the code string by himself/herself and consequently it is only possible

25 that one user informs the other about this particular operation mode but not
about the code string for triggering specific functions.

E. g. such specific functions or actions of the device may be flashing of the
contents of a display of the device, flashing of the backlight of the display,

30 playing of a ringing tone or another short melody, presenting an animated
graphic on the display, or the like.

Although it is possible to activate a special operation mode for triggering
specific functions by selecting a corresponding menu item, it is prefered that

35 the request comprises a start sequence leading the string of characters for
activating this special operation mode.

1   To keep the user eager to get the code it is provided that the specific function or one of the specific functions is performed to indicate that one of the characters of the string input by the user matches a character of the code string. Hence, the user can get the code step by step so that she/he will not

5   be discouraged or frustrated in case that he/she can not get the complete code in a reasonable time.

Another development of the present invention is characterized in that more than one of the group of specific functions are performed in case that more

10   than one of the characters of the string input by the user match respective ones of the characters of the code string.

Further, according to specific refinement of the present invention it is provided that another specific function is performed in case that the string input

15   by the user matches the code string.

Such another specific function or action may be a specific combination of the above mentioned actions or functions or may be e. g. making new ringing tones available, providing a special access code for downloading new ringing

20   tones and/or new display logos via radio communications network or Internet, downloading new functions or actions for use with the operating mode provided by the present invention.

According to a preferred refinement of the present invention it is provided

25   that the code string is changed by randomly generating a new code string after performing the specific function or functions if all of the characters of the string input by the user match the characters of the code string. Alternatively it is possible that the code string is changed by randomly generating a new code string at certain intervals; wherein the interval of changing the code

30   string is randomly determined after each change of the code string.

Therefore, it is possible to keep the operation mode provided by the present invention interesting since the user has always to guess the valid code string for triggering certain actions or functions. Even if the user get the code prior

35   to changing it, the user can be never sure whether the code he/she got is still the valid code.

1   According to a further development of the present invention the request is input by means of a keypad or by selecting characters from a list displayed on a display particularly by means of turn-push-button. Additionally it is possible that the request is input via an air interface. Thus, in case that the elec-

5   tronic device is a mobile telephone, a special string of characters can be sent via SMS (Short Message Service) to the mobile telephone of a friend as a request used in the operation mode provided by the present invention to see how her/his mobile telephone reacts on that request.

10   According to another preferred refinement of the present invention it is provided that the request comprises a terminating character indicating the end of the string of characters input by a user. Hence, it is not necessary to use a fix number of characters for both the input string and for the code string. In particular, the number of characters of the code string can be also changed

15   randomly between certain values so that a user has also to enter input strings with different numbers of characters for getting the code.

BRIEF DESCRIPTION OF THE DRAWINGS

20   The present invention will be explained in more detail with reference to the accompanying drawings showing preferred embodiments.

Figure 1a shows a schematic block diagram of a mobile telephone operable in accordance with the present invention.

25

Figure 1b shows a part of the block diagram of Figure 1 for another embodiment of the present invention.

Figure 2 shows a simplified schematic block diagram of the software architec-

30   ture used with the present invention.

Figure 3 shows a flow chart of the method according to the present invention.

Figure 4 shows a part of the flow chart according to Figure 3 for another em-

35   bodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

1   As shown in Figure 1a, a usual mobile telephone operable with the present
    invention comprises a display 10 driven by a display driver 11 and provided
    with a backlight driven by a respective display backlight driver 12 and illumi-
    nating the background of the display so that the contents displayed thereon
5   is shown with enhanced contrast. The display driver 11 and the display back-
    light driver 12 are connected to a central module 13 that comprises a micro-
    controller MC, a memory MEM and other support functions SF. The micro-
    controller MC of the central module is the master of the system. The central
    module 13 is connected to a radio frequency (RF) module 14 that is used for
10 implementing an air interface 15 to enable access to a radio communications
    network. The RF module 14 is used for sending and receiving short messages
    (SMS) the contents thereof are generated or received by the microcontroller of
    the central module 13. In addition, the RF module 14 is used in a usual man-
    ner for sending and receiving data and/or information during a telephone
15 call.

    Further, a keypad 16 is connected to the central module 13 via a keypad
    driver 17 and serves as input means for operating the mobile telephone. As
    shown in Figure 1b illustrating another embodiment of a mobile telephone
20 used with the present invention, a turn-push-button 18 used as input means
    is connected to the central module 13 via a respective button driver 19. The
    turn-push-button 18 can be used instead of the keypad or in addition to the
    keypad 16. At least, a power supply module 20 is connected to the central
    module 13 to supply power for the whole system.
25
    Whereas the keypad 16 and/or the turn-push-button 18 are used as input
    means the display is used as feedback device to display alphanumeric infor-
    mation as well as graphical items. The display 10 is controlled by the micro-
    controller MC of the central module 13 via the display driver 11. In addition,
30 the backlight of the display 10 is used as feedback means as well. In particu-
    lar, the backlight that is controlled by the microcontroller MC of the central
    module 13 via display backlight driver 12 illuminates the display to enhance
    the visibility of the contents shown on the display 10 and to indicate that the
    mobile telephone is active. In case that the input means, i.e. the keypad 16
35 and/or the turn-push-button 18 are locked to prevent unintended use of the
    mobile telephone the backlight is kept switched off by the microcontroller MC

1   of the central module 13 so as to indicate that the input means have to be unlocked prior to operating the mobile telephone.

As shown in Figure 2 the software architecture comprises three different soft-
5   ware modules, i.e. an input driver 21, a main program or core algorithm 22 and a feedback driver 23. The input driver 21 comprises the program routines necessary for receiving input information from the keypad 16, turn-push-button 18 or from the radio frequency module 14 according to the SMS standard, for extracting the special string from the request input by a user and for
10   passing this special string to the core algorithm 22. Correspondingly, the feedback driver 23 comprises the program routines used to drive mobile telephone actions triggered by the core algorithm that will be explained in more detail below. According to the present embodiment the feedback driver 23 controls the display and the display backlight via display driver 11 and dis-
15   play backlight driver 12. In case that one of the functions or actions triggered by the core algorithm is playing a ringing tone or a melody the feedback driver 23 provides the necessary control information for a respective tone generator.

20   The core algorithm uses three variables for data storing and handling, i.e. the input string, the code string and an array of functions. The input string can be an array of a fixed number of characters, for example for four integers ranging from 0 to 9. Similarly, the code string is an array of a fixed number of characters and in accordance with the described embodiment an array of
25   four integers ranging from 0 to 9.

To enhance the difficulty of getting the code string, it is also possible to vary the number of characters used for the code string randomly. In this case another variable is necessary to indicate the number of characters actually used
30   for the code string.

At least, the action or function array is an array for a certain number of characters, e.g. of four integers ranging from 0 to 3 or of five integers ranging from 0 to 4. These integers refer to specific mobile telephone actions or func-
35   tions, e.g. to flashing the contents of the display 10 several times, flashing the display backlight several times, playing a ringing tone or another short melody, or showing an animated graphic on the display 10. Another specific

1　function or action that is referred to by one of the characters of the action ar-
ray, e.g. by the last of the five integers may be a specific combination of the
afore-mentioned actions or may be e.g. making new ringing tones available,
providing a special access code for downloading new ringing tones, new melo-

5　dies, and/or new display logos via the respective radio communications net-
work or via Internet, or downloading new functions or actions for use with
the present invention.

According to Figure 3 the core algorithm for performing the inventive method

10　performs an initialization step S10 after starting the algorithm. During ini-
tialization the array for the variable input string is cleared. Thereafter, the
array for the variable code string is filled with four random integers. At least,
the array for the action array is filled with four integers randomly as well.

15　However, it is also possible to use the code string used during the last run-
time of the algorithm for the new runtime. In this case, it is checked whether
or not the user got the complete code string during the last runtime and if
not the code string remains unchanged. Otherwise the code string is changed
by filling the respective array with four integers randomly.

20

According to another embodiment of the present invention, it is checked
whether a certain predetermined time interval has been expired prior to
changing the code string. In this case the code string will be only changed if
the predetermined time interval has been expired. Thereafter, the length of

25　the time interval for determining changing of the code string can be also ran-
domly determined.

After completing initialization a user inputs a request and the corresponding
array is filled with four integers entered by the user as a request that prefera-

30　bly consists of a start sequence, e.g. "*#", the special input string of the four
integers, e.g. "1234", and a terminating character, e.g. "#". Upon filling the
integers or digits into the respective array in step S11, it is checked whether
the first digit of the code string is equal to the first digit of the input string in
step S12. If so, one of the above-mentioned specific actions is triggered in

35　step S13. Thereafter, the algorithm continues with step S14 for checking
whether or not the second digits of the code and the input string are equal. If
so, a second specific function or phone action is triggered in step 15.

1   Thereafter, the third digits of the input and the code string are compared in step S16. If the compared digits are equal the next phone action is triggered in step S17.

5   Then, the fourth digits of the code and the input string are compared with each other and if they are equal to each other the fourth phone action is performed in step S19.

     Then, it is checked in step S20 whether all digits of the input string equal the
10   digits of the code string, i.e. whether the input string completely matches the code string. If not, the algorithm returns to step S11 so that the user has the chance to continue to guess the code string. Otherwise, i.e. in case that the input string completely matches the code string the method returns to the initialization in step S10 for changing at least the code string randomly.

15
     According to another embodiment of the present invention it is also possible that in case that it was decided in step S20 that the input string completely equals the code string to trigger a special phone action in step S21 prior to repeating the initialization.

20
     For triggering specific functions or phone actions in step S13, S15, S17, S19, and S21 trigger signals are generated only and supplied to the feedback driver 23. Thus, it is possible to perform the respective functions or phone actions in parallel or sequentially. Because the variable action array is set up
25   randomly with integers during initialization, the specific functions or phone actions are independent from the digit number inside the input string and the code string.

     Because the special string "*#1234#" does not interfere with any other user
30   inputs there is no need to stop the algorithm so that the user can try to guess the actual code string every time after switching on his/her mobile telephone.

     Since it is possible to replace the input via the keypad 16 or the turn-push-button 18 by an input via SMS, i.e. via the air interface 15, a user of another
35   mobile telephone can participate in trying to get the code string.

1   Thus, to use the particular operation mode provided by the present invention
it is only necessary to enter a specific string like "*#1234#" as a request for a
specific function or a group of specific functions. The first two characters "*#"
are used as start sequence, i. e. to activate the particular operation mode.

5   However it is also possible to activate the special operation mode provided by
the present invention by selecting a corresponding menu item. The second "#"
indicates the end of the string and is used as a terminating character. Such a
terminating character can be omitted in case that the input string "1234" has
a fixed number of digits. However, if the number of digits used for the code

10   string can be varied randomly, a terminating character is necessary to indi-
cate the end of the request. "1234" stands for a four-digit number input by a
user.

Upon typing or inputting the request the number "1234" of the input string is

15   compared with a random number, i.e. with the code string generated by the
mobile telephone itself. In case that one or more digit of the input string
matches a respective one of the code string, at least one specific function or
phone action is triggered as described above.

20   Although the present invention has been explained in detail for use with a
mobile telephone, it is also possible to use the present invention with another
electronic device having input means, micro computer means, and feedback
or output means, e.g. with a personal computer (PC).

25

30

35